cont of
D9/972 744

CLAIMS

What is claimed is:

1. A composition, comprising a cell encoded with a detectable label.
2. The composition of claim 1, wherein the cell is prokaryotic.
3. The composition of claim 1, wherein the cell is eukaryotic.
4. The composition of claim 3, wherein the cell is selected from the group consisting of a yeast cell, an amphibian cell, a mammalian cell and a plant cell.
5. The composition of claim 4, wherein the cell is a mammalian cell selected from the group consisting of a human cell, a mouse cell, a rat cell, a bovine cell, and a hamster cell.
6. The composition of claim 1, wherein the detectable label is selected from the group consisting of a semiconductor nanocrystal (SCNC), a fluorosphere, a nanobar, a light scattering particle, and a microsphere comprising an SCNC.
7. The composition of claim 6, wherein the detectable label is an SCNC.
8. The composition of claim 1, wherein the cell comprises an intracellular semiconductor nanocrystal.
9. The composition of claim 1, wherein the cell comprises an extracellular semiconductor nanocrystal.
10. The composition of claim 1, wherein the cell comprises a membrane-associated semiconductor nanocrystal.
11. The composition of claim 7, wherein the semiconductor nanocrystal comprises a core and a shell.
12. The composition of claim 11, wherein the core is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS,

CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, AlAs, AlP, AlSb, AlS, Ge, Si, Pb, PbS, PbSe, an alloy thereof, and a mixture thereof.

13. The composition of claim 12, wherein the core is CdSe.

14. The composition of claim 13, wherein the shell is ZnS.

15. The composition of claim 1, wherein the cell further comprises an organic fluorophore.

16. A method of distinguishably identifying a cell, comprising: providing a cell; and contacting the cell with a semiconductor nanocrystal under conditions in which the semiconductor nanocrystal is associated with the cell to provide a labeled cell thereby identifying the cell.

17. The method of claim 16, wherein the semiconductor nanocrystal comprises a core and a shell.

18. The method of claim 17, wherein the core is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, AlAs, AlP, AlSb, AlS, Ge, Si, Pb, PbS, PbSe, an alloy thereof, and a mixture thereof.

19. The method of claim 18, wherein the core is CdSe.

20. The method of claim 19, wherein the shell is ZnS.

21. The method of claim 16, wherein the cell further comprises a fluorophore.

22. The method of claim 16, wherein the labeled cell comprises an intracellular semiconductor nanocrystal.

23. The method of claim 16, wherein the labeled cell comprises an extracellular semiconductor nanocrystal.

24. The method of claim 16, wherein the labeled cell comprises a membrane-associated semiconductor nanocrystal.

25. The method of claim 16, wherein the conditions comprise forming pores in the cell.

26. The method of claim 25, wherein the pores are formed by contacting the cell with a porogen.

27. The method of claim 26, wherein the porogen is digitonin.

28. The method of claim 26, wherein the porogen is a member of the complement cascade.

29. The method of claim 25, wherein the pores are formed in the cell by electroporation.

30. The method of claim 25, wherein the pores are formed by osmotic shock.

31. The method of claim 16, wherein the conditions comprise contacting the cell with an SCNC-containing micelle.

32. The method of claim 31, wherein the micelle is formed by an agent selected from the group consisting of cholic acid, glycocholic acid, and taurocholic acid, and salts thereof.

33. The method of claim 16, wherein the conditions comprise microinjection.

34. The method of claim 16, wherein the conditions comprise endocytosis.

35. The method of claim 17, wherein the semiconductor nanocrystal is linked to a ligand capable of localizing the SCNC to a subcellular component.

36. The method of claim 16, wherein the semiconductor nanocrystal is linked to a ligand capable of binding specifically to a cell-surface receptor.

37. The method of claim 16, wherein the semiconductor nanocrystal is linked to a conjugating agent which is capable of specifically attaching to a cell-surface molecule.

38. A method of identifying a cell in a mixed population of cells, comprising mixing a composition comprising a cell encoded with a detectable label with a cell distinct therefrom to form a mixed population, culturing the mixed population, applying an excitation source to the mixed population, and detecting the detectable label to identify the encoded cell.

39. A method for detecting a cell receptor, the method comprising contacting the cell with at least one ligand wherein the ligand is conjugated to a semiconductor nanocrystal and wherein the ligand is capable of binding specifically with the receptor.

40. The method of claim 39, wherein the cell is contacted with more than one ligand.

41. The method of claim 40, wherein each ligand is conjugated to a different semiconductor nanocrystal.

42. The method of claim 39, wherein the semiconductor nanocrystal comprises a core and a shell.

43. The method of claim 42, wherein the core is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, AlAs, AlP, AlSb, AlS, Ge, Si, Pb, PbS, PbSe, an alloy thereof, and a mixture thereof.

44. The method of claim 43, wherein the core is CdSe.

45. The method of claim 44, wherein the shell is ZnS.

46. The method of claim 39, wherein the receptor is a transporter protein.

47. The method of claim 46, wherein the transporter receptor is a G-protein coupled receptor.

48. The method of claim 47, wherein the ligand is translocated into the cell.

49. The method of claim 39, wherein the cell further comprises an organic fluorophore.

50. A method for screening modulators of a receptor mediated response in an encoded cell, the method comprising:

a) contacting the encoded cell with a predetermined concentration of a compound to be tested;

b) detecting a signal from the cell thereby decoding the cell;

c) c) detecting the receptor mediated response; and

d) comparing the response in (c) with the response produced in the absence of the compound thereby identifying the compound as a modulator of the receptor mediated response.

51. The method of claim 50, wherein the cell is selected from the group consisting of a yeast cell, an amphibian cell, a mammalian cell and a plant cell.

52. The method of claim 51, wherein the cell is a mammalian cell selected from the group consisting of a human cell, a mouse cell, a rat cell, a bovine cell, and a hamster cell.

53. The method of claim 50, wherein the receptor is a G-protein coupled receptor.

54. The method of claim 50, wherein the encoded cell is encoded with a semiconductor nanocrystal comprising a core and a shell.

55. The method of claim 54, wherein the core is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, AlAs, AlP, AlSb, AlS, Ge, Si, Pb, PbS, PbSe, an alloy thereof, and a mixture thereof.

56. The method of claim 55, wherein the core is CdSe.

57. The method of claim 56, wherein the shell is ZnS.

58. The method of claim 50, wherein the cell further comprises an organic fluorophore.

59. The method of claim 50, wherein the detecting comprises photochemical means.

60. The method of claim 50, wherein the detecting comprises spectroscopic means.

61. The method of claim 50, wherein the detecting comprises flow cytometry.

62. A method for screening for modulators of G protein coupled receptors (GPCR), the method comprising:

contacting an encoded cell with a predetermined concentration of a compound and a translocatable molecule wherein the translocatable molecule is distinguishably labeled;

decoding the cell;

detecting the label on the translocatable molecule; and

comparing the label on the translocatable molecule in the cell in the presence of the compound to that in the absence of the compound wherein an increase or decrease indicates the compound is a modulator.

63. The method of claim 62, wherein the cell is selected from the group consisting of a yeast cell, an amphibian cell, a mammalian cell and a plant cell.

64. The method of claim 63, wherein the cell is a mammalian cell selected from the group consisting of a human cell, a mouse cell, a rat cell, a bovine cell, and a hamster cell.

65. The method of claim 62, wherein the encoded cell is encoded with a semiconductor nanocrystal comprising a core and a shell.

66. The method of claim 65, wherein the core is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, AlAs, AlP, AlSb, AlS, Ge, Si, Pb, PbS, PbSe, an alloy thereof, and a mixture thereof.

67. The method of claim 66, wherein the core is CdSe.

68. The method of claim 67, wherein the shell is ZnS.

69. The method of claim 62, wherein the cell further comprises an organic fluorophore.

70. The method of claim 62, wherein the detecting comprises detecting a decrease in the label on the translocatable molecule outside the cell.

71. The method of claim 62, wherein the detecting comprises photochemical means.

72. The method of claim 62, wherein the detecting comprises spectroscopic means.

73. The method of claim 62, wherein the detecting comprises flow cytometry.